

LVIII.—On the Relations of the *Myrmecophile* Lepismidæ to Ants. By M. CHARLES JANET*.

THE numerous species of animals which live in ant-hills, and which for this reason have been called "Myrmecophile," have very varied relations with the ants †.

A certain number of Staphylinidæ, such as *Myrmedonia funesta*, which have been especially studied by Wasmann, capture the ants at the entrance to their galleries or the larvæ in the deeper parts of the nest and devour them (*myrmecophagy*).

Certain Nematodes plant themselves in the pharyngeal glands of the Camponotidæ, in order there to pass through a larval stage (*internal parasitism*) ('Comptes Rendus,' t. cxvii. p. 700, 1893).

Certain Acarids attach themselves to different parts of the bodies of the ants, and especially to the head and feet (*external parasitism*).

A considerable number of Arthropods enter the ants' nest for hardly any other purpose than to seek the detritus, of which they are able to make some use, or to find there favourable conditions for their existence, and they are treated with indifference by their hosts. This is the case with a little Isopod Crustacean, *Platyarthrus Hoffmannseggii*, which is so common in ant-hills all over Europe. This cohabitation in the same nest of a myrmecophile species with ants has been called *synæketism* when there is no direct relation between them.

Many of the Staphylinidæ and Pselaphidæ live normally in ants' nests. They bear on the dorsal region tufts of hair, corresponding with certain glands the secretion of which is much sought after by the ants, who, in exchange for it, pour out for them voluntarily before their mouths a liquid food. There is in this case between the ants and their guests a symbiosis with reciprocal advantages, constituting the *myrmecoxeny* of Emery. Wasmann has shown that among the myrmecophile Staphylinidæ the reduction, more or less pronounced, of the palps was, so to speak, the expression of the degree of dependence of these insects upon the ants who housed them.

* From the 'Comptes Rendus,' tome cxxii. 1896, pp. 799-802.

† A classified list of myrmecophile animals will be found in a recent book, exceedingly useful to naturalists engaged in the study of ants, Wasmann, Erich, 'Kritisches Verzeichniss der myrmecophilen und termitophilen Arthropoden' (Berlin, 1894).

This dependence is pushed to the last degree in the case of *Claviger testaceus*, which is to be found often enough on the ant-hills near Paris. Although in artificial nests one can see these Coleoptera attach themselves from time to time to the dead larvæ, which they appear to suck for a moment, it may be said that their true food is only that provided for them by their hosts, because they die rapidly when they are separated from them.

As for the Aphides, they are not truly myrmecophile: it is true that they are greatly sought after by ants, who obtain from them an abundant supply of food, and who, in exchange, can extend to them a more or less real protection; but they neither ask nor obtain from the ants anything, and even in general do without them.

The Lepismidæ have for a long time been classed as myrmecophile, but their relations to ants have up to the present been but imperfectly understood. I have had occasion to notice in my artificial nests specimens of *Lepismina polypoda*, Grassi, taken with a colony of *Lasius umbratus*, Nyl., genus *mixtus*, Nyl.

In the first nest I placed some *Lepismina* without ants, in a second *Lepismina* with the ants with which they had been taken.

The *Lepismina* which had been brought up without ants received as food a mixture of honey, sugar, flour, and yolk of egg. They numbered at the beginning of the observations twenty-one; at the expiration of two years and six months there were still nine of them remaining in good condition, and these readily ate the liquid honey which was given to them on the point of a pair of very fine forceps.

The *Lepismina* brought up with the ants with which they had been captured were much more lively than those from the other nest. They were in a state of constant movement, and ran about among the ants, but took great care never to remain stationary in their neighbourhood.

Occasionally I saw the ants threaten the *Lepismina*, and even throw themselves upon them; but in the latter case they were so agile that they invariably escaped. Nevertheless, in my artificial nest, in which they could not so easily reach a place of safety as in a natural nest, they were sooner or later caught. Two days after setting up the nest I found five dead bodies, which the ants seized in their mandibles and carried about the nest. In order to save the survivors I began their training in a new nest, only certain portions of which were accessible to the ants, or, at least, but little frequented by them. There the *Lepismina* remained for a long

time in a state of repose, completely motionless; but when an individual ant passed near to one of them it never failed to make a sharp movement in order to push it out of the way.

If the food smeared with honey, which was placed in the empty chamber of the nest, was withheld for several days and then replaced, a number of ants would be seen to come and make a lengthy meal on it, and when, after filling themselves as full as they could hold, they went back to the living chambers of the nest, they were assailed by their companions, who came to ask, with their antennæ, a share of the food.

The division began immediately. The one with the food and the one requiring it arranged themselves one slightly in advance of the other; the former drew aside its mandibles and protruded its proboscis, which its companion seized with its maxillæ, and disgorged some small drops, which were immediately absorbed.

From the moment that the first food-bearers entered the living chambers of the nest the *Lepismina* showed by their agitation that they had perceived the odour of honey.

Soon quite a number of ants were gathered in pairs for the business of disgorging. The bodies slightly drawn back, and often with the anterior feet raised, they left a certain interval between them below their heads. As soon as a *Lepismina* arrived near such a pair it would throw itself into this space, raise its head sharply, snap up the droplet which fell before it, and then get away as quickly as possible, as if to escape a pursuit which was deserved. But the ants, propped up one against the other, are not sufficiently free to move, and cannot even threaten the audacious thief, who runs off at once to put another pair under contribution; and this manœuvre is continued until hunger is satisfied.

One must conclude from these observations that *Lepismina polypoda* can do without the ants well enough when there is proper food at their disposal; that they are tolerated in the ants' nest for the simple reason that their agility saves them from pursuit by the ants; that they are attracted to the ants' nest by the bait of the nutritious liquid which the ants store in their crops; and that, contrary to what takes place in the case of myrmecoxeny, the ants do not give this liquid of their own free will to the *Lepismina*, but that these latter know how to take advantage of circumstances to possess themselves of it by stealth (*myrmecoclepty*).